

AMENDMENTS TO THE CLAIMS

Kindly amend the claims as follows:

Claims 1-95 (cancelled)

96. (currently amended) A safety trocar assembly having:

- a longitudinal central axis;
- a portal unit with elongated, tubular cannula having an open distal end;
- a trocar unit having an elongated obturator adapted to be removably inserted through said cannula, having a handle on a proximal end, and a penetrating end on a distal end, said penetrating end exposed through said open distal end of said cannula and having a cutting means for making an orifice in body cavity wall, a penetrating apex, and a sloping side wall that are immovable relative to said obturator;
- a protector means situated on said obturator and having a penetrating apex shield adapted to actuate between a retracted position in which said penetrating apex is open and an extended position in which said penetrating apex is closed by said penetrating apex shield and in the projection onto the plane normal to said longitudinal axis said sloping side wall surrounds said penetrating apex shield;
- said penetrating apex shield surrounds said penetrating apex and has distal edge forming ~~a fence~~ means for precluding the introduction, jamming, and engagement of tissue fibers of body cavity wall between said penetrating apex shield and said penetrating apex, ~~as well as between said penetrating apex shield segments;~~
- bias means for biasing said penetrating apex shield toward said extended position and for permitting said penetrating apex shield move to said retracted position in response to a proximally directed force applied to said penetrating apex shield distal edge; said bias means returning said penetrating apex shield to said extended position when the force applied to said penetrating apex shield distal edge is removed, that occurs when said penetrating apex and said

penetrating apex shield distal edge have entered a patient's body cavity, however, before said penetrating end has been fully inserted into body cavity.

97. (previously presented) Device according to Claim 96, wherein said bias means is made as a spring mounted between said penetrating apex shield and parts of said obturator.

98. (previously presented) Device according to Claim 97, wherein said spring is situated in said obturator distal part.

99. (previously presented) Device according to Claim 96, wherein said penetrating apex shield is tubular.

100. (withdrawn) Device according to claim 96, wherein:

- the displacement vector of said protector between its said extended and retracted positions is in the plane parallel to said longitudinal central axis;

- said cutting means comprises at least one cutting edge having distal end and situated in the plane parallel to said longitudinal central axis so that this plane is the cutting plane of said cutting edge;

- said protector means has a shield for protection of said cutting edge;

- said shield has proximal protected position that is the extreme proximal position of said shield wherein said cutting edge distal end is protected;

- said shield has a screen area and as such serves portion of said outer surface which, when said shield is in said proximal protected position, is located outside said tubular cannula and outside said sloping side wall presenting an open part of said shield in said proximal protected position;

- said shield has a shield height and as such serves the distance from said shield outer surface to said cutting plane;

- said shield has a shield width and as such serves the distance from said shield out surface to said longitudinal central axis;

- said shield is characterized by a local comparative height equal to the ratio of local maximal said shield height to local maximal said shield width measured in their common local plane perpendicular to said device longitudinal axis;

- said shield is low-profile having maximal said local comparative height that within the limits of said screen area is less than 0.5.

101. (previously presented) Device according to Claim 96, wherein said cutting means comprises a penetrating apex cutting means protected by said penetrating apex shield.
102. (withdrawn) Device according to claim 100, wherein said penetrating apex is plate-shaped and said penetrating apex shield made as said low profile shield.
103. (withdrawn) Device according to claim 100, wherein said cutting means has an outer cutting means having at least one outer cutting member made as a knife situated outside of said penetrating apex shield within the limits of said sloping side wall.
104. (withdrawn) Device according to claim 103, wherein there is at least one outer shield for protecting said outer cutting means, therewith said penetrating apex shield and outer shield are movable independently of one another.
105. (withdrawn) Device according to claims 102, 103, 104, wherein said penetrating apex cutting means and outer cutting means are made integral on the plate-shaped base, said outer shield is made as low profile shield, and said penetrating apex shield and said outer shield have longitudinal slot, said plate base passes through.
106. (withdrawn) Device according to claim 104, wherein said outer shield is tubular and surrounds said penetrating apex, penetrating apex shield, and outer cutting means in said outer shield extended position.
107. (withdrawn) Device according to claim 96, wherein said portal unit has:

- a portal housing located on the proximal end of said tubular cannula;
- seals located in said portal housing for prevention a gas leakage from the body cavity;
- a locking means for locking said protector means in said extended position.

108. (withdrawn) A safety trocar assembly comprising:

- a trocar unit having elongated obturator with penetrating distal end;
- a longitudinal central axis of trocar assembly;
- a penetrating means for orifice formation in body cavity wall having at least two penetrating zones;
- a protector means, having independent protector members for independent protection of each of said penetrating zones adapted to independent moving between a retracted and an extended position and a resilient bias means for each of said protector members.

109. (withdrawn) Device according to claim 108, wherein there are:

- a portal unit with elongated, tubular cannula having an open distal end;
- a sloping side wall of said penetrating end and as such serves a portion of said penetrating end immovable relative to said tubular cannula during piercing the body tissue;
- said protector members are made as shields for protection of the cutting edges of said penetrating means; each of said cutting edge is situated in a cutting plane parallel to said longitudinal central axis;
- each of said shields has a proximal protected position that is the extreme proximal position of said shields wherein said cutting edges distal end is protected;
- said shield has a screen area and as such serves portion of said shield outer surface which, when said shield is in said proximal protected position, is located outside said tubular cannula and outside said sloping side wall presenting an open part of said shield in said proximal protected position;
- said shield has a shield height and as such serves the distance from said shield outer surface to said cutting plane;
- said shield has a shield width and as such serves the distance from said shield outer surface to said longitudinal central axis;
- said shield is characterized by a local comparative height equal to the ratio of local

maximal said shield height to local maximal said shield width measured in their common local plane perpendicular to said device longitudinal axis;

- at least one said protector member has maximal said local comparative height that within the limits of said screen is less than 0.5.

110. (withdrawn) Device according to claim 108, wherein said penetrating means has at least one distal and one proximal said penetrating zones provided with a distal and proximal said protector members, respectively.
111. (withdrawn) Device according to claim 110, wherein the displacement of said proximal protector member from said extended position to said retracted position demands greater efforts than identical displacement of said distal protector member.
112. (withdrawn) Device according to claim 111, wherein the rigidity of said bias means of said proximal protector member is more than the rigidity of said bias means of said distal protector member.
113. (withdrawn) Device according to claim 108, wherein said penetrating zones are situated around said longitudinal axis at regular intervals from each other.
114. (withdrawn) Device according to claim 109, wherein said protector members are made as a floating common shield for at least two penetrating zones having said maximal local comparative height that within the limits of said screen area is less than 0.5, said penetrating means made as said cutting members with common cutting edge so that each of said cutting members is protected by its regions of said common shield and each of said common shield regions is biased by its own said bias means thereby converting said regions of common shield into said independent protector members.
115. (withdrawn) Device according to claim 114, wherein said common shield and said bias means are made as one detail.
116. (withdrawn) Device according to claim 108, wherein said protector members are made as separate shields.
117. (withdrawn) Device according to claim 109-116, wherein there are two said cutting members and said protector members are made as plate-shaped said shield plates situated parallel to the said cutting planes of respective said cutting members.
118. (withdrawn) Device according to claims 108-116, wherein said shields are tubular, therewith said distal shield of said distal penetrating zone has less diameter than said proximal shield of said proximal penetrating zone and both said shields are arranged equidistantly to one another and to said longitudinal central axis.
119. (withdrawn) Device according to claim 108, wherein there is a portal unit with an elongated tubular cannula having an open distal end through which said penetrating end of said obturator is exposed.

120. (withdrawn) Safety trocar assembly device having:

- a portal unit with elongated, tubular cannula having an open distal end;
- a trocar unit having an elongated obturator adapted to be removably inserted through said cannula and having a penetrating end exposed through said open distal end of said cannula;
- a longitudinal central axis of trocar assembly;
- a penetrating means situated on said penetrating end of said obturator and having at least one penetrating zone with a cutting means that cuts the tissue in the cutting plane parallel to said longitudinal central axis, comprises at least one cutting edge having distal end and situated in said cutting plane;
- a displacement vector of said shield between its said extended and retracted position disposed in the plane parallel to said longitudinal axis of trocar assembly;
- said shield has proximal protected position, as such serves the extreme proximal position of said shield wherein said distal end of said cutting edge is protected;
- said shield has screen area and as such serves that portion of said shield outer surface which, in said shield proximal protected position, is located outside said tubular cannula and protrudes beyond the bounds of members of said trocar assembly immovable relative to said tubular cannula during piercing the body tissue;
- said shield has a shield height and as such serves the distance from said shield outer surface to said cutting plane;
- said shield has a shield width and as such serves the distance from said shield outer surface to said longitudinal central axis;
- said shield is characterized by a local comparative height equal to the ratio of local maximal said shield height to local maximal said shield width measured in their common local plane perpendicular to said device longitudinal axis;
- said shield is low-profile shield having maximal said local comparative height that within the limits of said screen area is less than 0.5, therefore said shield is low profile shield and perimeter of the cross section of said shield insignificantly exceeds the perimeter of the tissue incision made by said cutting means thereby enabling said shield entry said incision without substantial resistance of the edges of said incision.

121. (withdrawn) Device according to claim 120, wherein inner diameter of said tubular cannula is within 10 mm to 12.5 mm range and said maximal height of said shield along the entire said screen area is less than 3 mm, preferably 0.4 to 2 mm.

122. (withdrawn) Device according to claim 120, wherein inner diameter of said tubular cannula is

within 5 mm to 6.5 mm range and said maximal height of said shield along the entire said screen area is less than 1.5 mm, preferably 0.4 to 1.2 mm.

123. (withdrawn) Device according to claim 120, wherein said cutting edge has another end disposed proximally of said distal end.
124. (withdrawn) Device according to claim 123, wherein said shield is delineating shield in which tissue operated edge is made approximately congruent to said cutting edge and exposes said cutting edge approximately concurrently along the entire length.
125. (withdrawn) Device according to claim 123, wherein said shield is inverted shield which gradually exposes said cutting edge from said proximal end to said distal end during the displacement of said shield from said extended to said retracted position.
126. (withdrawn) Device according to claim 125, wherein said cutting edge is situated at an acute angle to said longitudinal central axis, and tissue operated of said shield is made stepwise.
127. (withdrawn) Device according to claim 120, wherein said shield is made plate-shaped.
128. (withdrawn) Device according to claim 120, wherein said shield and said bias means are made as an integral detail of the same material.
129. (withdrawn) Device according to claim 120, wherein there is at least two said penetrating zones and said protector means adapted to independent protection of each of said penetrating zones.
130. (withdrawn) Device according to claim 129, wherein said protector means are made as said separate shields with separate said bias means.
131. (withdrawn) Device according to claim 129, wherein said shield is a floating common shield for at least two penetrating zones of said cutting edge so that each of said penetrating zones is protected by its regions of said common shield and each of said common shield regions is biased by its own said bias means thereby converting said regions of common shield into said independent protector members.